Academic Journal of Humanities & Social Sciences
ISSN 2616-5783 Vol.3, Issue 11: 1-6, DOI: 10.25236/AJHSS.2020.031101

# Visual Thinking of User Needs in Interaction Design

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***ABSTRACT.*** *To study the visual thinking of user needs in interaction design, explore the interaction of mental models, interfaces, and interaction methods, Through the methods of comparative research and case analysis, on the basis of research visualization and marketization, summarizes the current valuable practice and exploration methods in the fields of information and interaction design. In the context of current design psychology, analyzing user needs and using reasonable visual thinking presentation methods to meet the user's potential visual requirements, stimulate the user's mental image instinct, speed up the interaction process, and bring better user experience to the potential users, finally improves the core competitiveness of the product.*

***KEYWORDS:*** *Visual thinking, User needs, Interactive Design, Mental model*

## 1. Introduction

Recent years, with the rapid development of science and technology, interactive design has been greatly developed in various virtual product fields, especially in mobile electronic products. Traditional graphic design has also been transferred to new media technology, and it has gradually became the mainstream. Nowadays user needs have been integrated with social development and continue to expand. The pursuit of personalization has made more resources devoted to the design of graphical user interface (GUI), user interface (UI), and user experience (UX) during product development. An excellent GUI interface can make the product more popular and make it easier for users to quickly update the product, while a logical UX experience will allow customers to form a fixed way of using it, making the product just like a well-fitting garment, which makes people love it. Therefore, to develop a product which can meets the need of users, we designers not only need to meet the basic requirements for fashion and aesthetics of the current society from basic visual thinking, but also need to conduct quantitative and accurate investigation to research on user needs. Only by organically combining visual thinking with user needs, can we achieve both visual and functional requirements.

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## 2. The relevance of user needs and interaction design

### *2.1 The dialogue mechanism of interaction design*

At present, there are many interpretations for the definition of interaction design. One side believes that there is a perceived interaction between users and objects, and then the activities during this period can be called interaction design; the other side believes that interaction design refers to a certain In the media of communication or display, there is interaction between people and things. The above two explanations are both inappropriate. From the appearance of the term interaction design, it was not until the emergence of command language interfaces in the 1970s and 1990s that the concept of interaction design really appeared for the first time. Then, for example, a machine with interactive operation buttons or a sign design that can transmit information to people cannot be called interactive design. This also illustrates the limitations of the above two theories.

So how should interaction design be defined? From the point of view of the concept of interaction design drawn from the command language interface, interaction design must be connected with the existence of programming language, code, and electronic screen. From the seventeenth to eighteenth centuries, the German mathematician Gottfried Wilhelm Leibniz invented the concept of binary, to the invention of the "Turing machine" by Alan Mathison Turing in the early twentieth century, human society began to use machines instead of people to perform mathematical operations, and the information age advent. Then in the twentieth century, the invention of computers, the shrinking of servers, and the optimization of programming languages made it possible for people to do more things with programming languages. But then people also found that the communication between people and digital language is boring and complicated, the learning cost is high, and it cannot be the same as between people. In 1983, Apple released the first computer with a graphical interface-Apple Lisa. From then on, people can no longer deal with complex digital command characters. Graphics replaced most of the command language, making people intuitively interact with to communicate between computers.

*Figure. 1 Apple Lisa produced in 1983*

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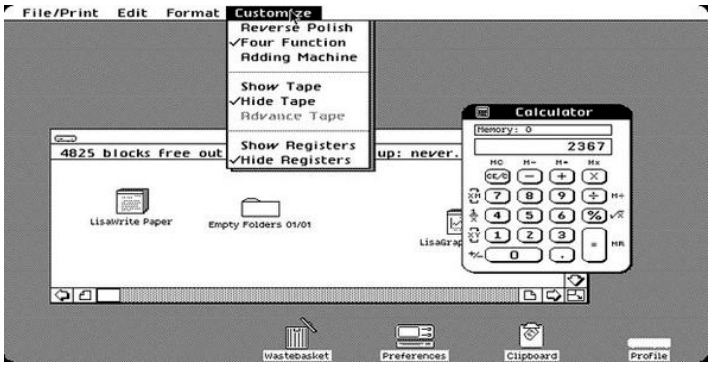


*Figure. 2 Apple Lisa's User interfaces*

At this point, the era has produced a new dialogue mechanism between humans and machines, which can reflect human psychology on complex man-made objects and make it more convenient for humans to use. Therefore, Interaction design should be born out of ergonomics, integrating cognitive psychology, behavioral theory and other disciplines and theoretical methods [1], and it is a "dialogue mechanism" between complex man-made objects and people with virtual interfaces as the carrier. By constructing a simple and effective mental mapping model, interaction design weakens the complexity of man-made objects while maintaining the original functions, allowing people to build basic cognition of man-made objects at a lower cost. Enables people to master man-made objects and make the use of man-made objects conform to the purpose of creation.

It can be seen that UX plays a guiding role in interaction design. Only from the direction of user needs can we design products that meet human needs.

### *2.2 The reflection of user needs in interaction design*

Reasonable user need refers to the appropriate functional needs and consumption desires of consumers with purchasing power. This kind of demand constitutes the real market. Functional products that can meet this need are directly related to purchase behavior. Specifically, the user needs in interactive design are reflected in the positioning of the product in the market. For example, in response to the need for personalized listening to songs, the market launches NetEase Cloud Music, Xiami Music and other music apps based on big data analysis; targeting different groups of people The demand for communication between the market has launched WeChat, LinkedIn, etc. which are different from the QQ social model. Because user needs determine different product positioning, the GUI style and UX user experience direction that serve the product are also different. For example, Taobao's main interface pushes the pictures of products that users are likely to buy based on big data calculations to stimulate users' potential purchase desires; while the user needs

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of news apps are to understand information, receive information, and choose what they are interested in for specific understanding, so the interactive interface of news applications is mostly composed of concise text and eye-catching graphics. These phenomena are not determined by the temperament of the application software itself, but by the temperament of the users who use this software.

Therefore, in the field of interaction design, the core of our research on users is the needs of users, and from the needs of users or potential users, we look for the positioning and functions of new products, and then establish the style of interaction design and the psychology of user groups. Produce and improve products that can meet the aesthetic and practical needs of users.

## 3. The relevance of user needs and visual thinking

### *3.1 User needs and visual thinking*

When people process image language, they will form mental images in the brain. This is a kind of image transmission effect. Media information can affect the inherent images in the human brain. When people receive and process new image information, they will refer to it. In the intentions constructed by the information received in the past [3], Bolting believes that there is a characteristic of interaction between people and external things, and personal experience depends on his inherent mental image.

Visual thinking is a visually logical thinking that visualizes user needs, so the visual thinking needs in interaction design are also part of the potential needs [4] of users. Visual thinking includes factors such as the overall framework and style of interaction design, graphic language elements in design, text design, and color perception affecting interaction design. For the visual needs of users, designers need to pay attention to color coding. Icon symbols are matched with target icons and interactive animation content.

Therefore, when we conduct interaction design, we collect and organize the user's visual thinking, which can stimulate the human instinct to process image information during the interaction process, thereby speeding up the interaction process, greatly shortening the user's thinking time, and bringing better use Experience [5]. Therefore, in interactive design, a large number of visual preferences of different visual thinking people should be collected, and various preferences should be screened and integrated to meet the needs of people of different classes, different age groups, and different genders, improve user experience, and increase product competition force.

### *3.2 Case analysis of visual thinking in user needs*

Take "DongQiuDi" APP as an example. This is an application about British football. Its user group is mainly aimed at domestic football fans. The analysis of the

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user needs of this group mainly comes from several aspects: domestic and foreign football Information, real-time game consultation, a platform for watching football chatting, football game communication, football equipment, football lottery, football highlights videos, etc. Due to the particularity of the fan group, fans of different teams or players have different user needs for obtaining information, so they have different visual thinking when using this APP. Analyze the framework of this application, which is different from the immersive reading of Weibo. The upper and lower part of the function bar is fixed, and the middle part is scrolling information. This part is the same as other news information applications. The biggest difference is time. on. Due to the fixed time of football matches, fans have different needs for obtaining information at different times. At the beginning of the week, they will need to understand the situation of the last week. In the middle of the week, they will mainly read various analysis columns and football news. On weekends, they need to know before the game. For the preparation information of the game, the real-time match situation will be paid attention to on the match day. That is to say, the user visual process of this section is different in a week, so the background will actively push the user's respective favorite team information in the most important position that can be observed at a glance based on the big data analysis of the respective users. If the user has a stronger interest in today's news, there will be the team logo of the home team in the lower function bar, which will only show all the information about this team.

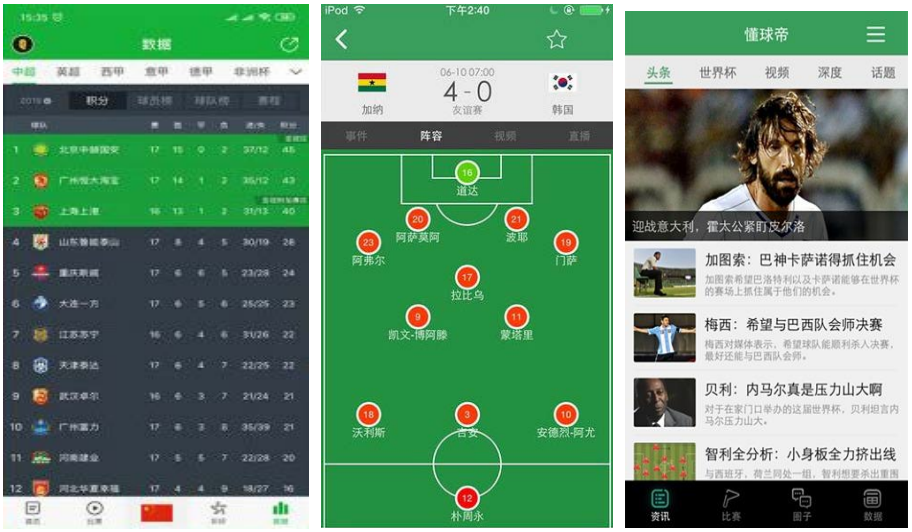


*Figure 3. "DongQiuDi" APP's user interfaces*

From the analysis of this APP, the user needs are presented on the graphical user interface in a relatively reasonable way through visual thinking, which meets the special user requirements of the fan group in obtaining football information.

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## 4. The future trend of visual thinking in interaction design

From the perspective of technological development, interactive design initially moved from PC to mobile, which is the mainstream right now. Device updates and iterations dominate the continuous changes in interaction methods. Initially, mobile devices could only interact through the manipulation of hardware devices (mouse, buttons), but later display devices were replaced by LCD screens from electronic picture tubes, and then touch screen interaction methods appeared. Now 3R technology (AR, VR, MR) is making rapid progress, gradually appearing in the field of vision, and new ways of interaction are also about to emerge. Along with the visual thinking will also change, 3R technology will advance the interaction design from the two-dimensional era to the three-dimensional era.

## 5. Conclusion

To sum up, as a part of user needs, visual thinking can be used in interaction design to meet the needs of users' heterogeneity [6]. It can also update and improve users' aesthetic functions, so that users have the ability to use interactive products. With the continuous advancement of technology and the emergence of new interactive methods, visual thinking is facing new opportunities to elevate the inherent mental image of human beings to another dimension. But the part about people based on psychology is still worthy of our careful analysis. User needs are not put forward by users. It is hidden in people's behavior patterns and psychological activities. Designers need to study and explore its potential and possibilities.

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